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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/615,926	07/10/2003	Hideaki Yamasaki	010986.52578US	9914
23911 7590 04/30/2007 CROWELL & MORING LLP INTELLECTUAL PROPERTY GROUP P.O. BOX 14300 WASHINGTON, DC 20044-4300			EXAMINER LUND, JEFFRIE ROBERT	
			ART UNIT 1763	PAPER NUMBER
			MAIL DATE 04/30/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/615,926

**Applicant(s)**

YAMASAKI ET AL.

**Examiner**

Jeffrie R. Lund

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 30-33 and 36-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 30-33 and 36-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 30-33, 38-41, 47, 49, 51, and 52 are rejected under 35 U.S.C. 102(b) as being anticipated by Tomita et al, JP 2001-214270.

Tomita et al teaches a CVD apparatus that includes: a reaction chamber 1 evacuated by an evacuating system 3 and supporting a substrate 6 on a support 7; a source bottle 16-19 containing a liquid source material and forming a source gas therein as a result of vaporizing caused by a vaporizing gas (Ar) supplied via a first MFC 33-36 and vaporizing gas source line 20-23; a source gas supply lines 24-27 and 2 supplying said source gas from the source bottles 16-19 to said reaction vessel 1; a diluting inert gas supplied via a second MFC 37 and connected to the source gas supply line 2 at a node (junction of gas supply line 2 and source gas supply lines 24-27); a gas analyzer 46 provided parallel to the source supply line; a bypass gas line 9 connected to the gas analyzer 46 via valve 13; and a controller 47 controlling the first MFC 33-36 and second MFC 37, which control the flow rate of the gases as a result of the measurement of the concentration analyzer 46. (Figure, paragraph 20+) The specific gas is an intended use of the apparatus, and the apparatus of Tomita et al can inherently supply the desired gas.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claim 30-33, 36, 40, 41, 43-47, and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ono, JP 47-10730, in view of Tokai et al, US Patent Application Publication 2002/0014700 A1.

Ono teaches a CVD apparatus that includes: a reaction chamber 1 evacuated by an evacuating system and supporting a substrate 22 on a support 21; a source bottle 26 containing a liquid source material and forming a source gas therein as a result of vaporizing caused by a vaporizing gas (Ar) supplied via valve 24 and vaporizing gas source line; a source gas supply line supplying said source gas to said reaction vessel 1; a diluting inert gas supplied via valve 23 and connected to the source gas supply line

at a node; a gas analyzer 27 provided in the source supply line; and a controller 31 controlling the valves 23, 24, which control the flow rate of the gases as a result of the measurement of the concentration detector 31. (Figure 2)

Ono differs from the present invention in that Ono does not teach that: the valves are mass flow controllers (MFC); the controller receives input from a manometer (pressure sensor) and corrects the measured concentration based on the pressure; or the source is  $W(CO)_6$ .

Tokai et al teaches a coating chamber that includes: MFCs 23a, 23b to control the flow of the source gases; and a controller 38 that controls the gas sources 14 based on input from concentration detectors 36, 37 and a pressure sensor 60.

The motivation for replacing the valves of Ono with the MFCs of Tokai et al is to more accurately control the supply of process gases to the reaction chamber of Ono.

The motivation for controlling the concentration of the source gas in the apparatus of Ono using signals from both the concentration detector and pressure sensor as taught by Tokai et al is to control the source flows based on their concentrations, adjusted for the pressure.

The motivation for supplying  $W(CO)_6$  to the apparatus of Ono is to deposit a layer containing tungsten, as is well known in the art.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the valves of Ono with MFCs as taught by Tokai et al; control the gas sources of Ono using information supplied by the concentration detector and pressure sensor as taught by Tokai et al; and use  $W(CO)_6$  as the source

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gas.

6. Claims 38, 39 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ono and Tokai et al as applied to claims 30-33, 36, 40, 41, 43-47, and 51 above, and further in view of Tomita et al, JP 2001-214270.

Ono and Tokai et al differ from the present invention in that they do not teach a bypass line is connected to the source gas line to bypass the reaction vessel and the evacuation system is provided to the gas analyzer.

Tomita et al was discussed above and includes a bypass line 9 connected to the source gas line 2 to bypass the reaction vessel 1 and the evacuation system is provided to the gas analyzer 46.

The motivation for adding the bypass line of Tomita et al to the apparatus of Ono and Tokai et al is to enable the apparatus of Ono and Tokai et al to allow the source gas to be dumped to maintain a constant flow of the source gas when the apparatus is not in use, and to enable the supply lines to be evacuated.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the bypass line of Tomita et al to the apparatus of Ono and Tokai et al.

7. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ono and Tokai et al as applied to claims 30-33, 36, 40, 41, 43-47, and 51 above, and further in view of Ueda et al, US Patent 5,365,772.

Ono and Tokai et al differ from the present invention in that they do not teach that the gas analyzer is located parallel to the source gas supply line and isolated by two

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valves.

Ueda et al teaches a gas analyzer 39 located parallel to a gas line 32 (from which the sample is taken) and isolated by valves 37 and 41. (Figure 3)

The motivation for moving the gas analyzer of Ono and Tokai et al from the source gas supply line to a line parallel to the source gas supply line is to provide an alternate and equivalent location for the gas analyzer as taught by Ueda et al.

Furthermore, it has been held that the rearrangement of parts is obvious. (See In re Japikse 86 USPQ 70)

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to move the gas analyzer of Ono and Tokai et al to a position parallel to the source gas supply line and isolate the gas analyzer with valves as taught by Ueda et al.

8. Claims 42 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ono and Tokai et al as applied to claims 30-33, 36, 40, 41, 43-47, and 51 above, and further in view of Satake et al, JP 2001-234348.

Ono and Tokai et al differ from the present invention in that they do not teach that the concentration detector is a FTIR.

Satake et al teaches a coating chamber that includes a FTIR concentration detector 20. (Abstract, figure 7)

The motivation for using a FTIR concentration detector in the apparatus of Ono and Tokai et al is to provide a specific concentration detector as required but only generically disclosed by Satake et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the FTIR concentration detector of Satake et al in the apparatus of Ono and Tokai et al.

9. Claims 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ono and Tokai et al as applied to claims 30-33, 36, 40, 41, 43-47, and 51 above, and further in view of Holst et al, US Patent Application Publication 2003/0056723 A1.

Ono and Tokai et al differ from the present invention in that they do not teach that the concentration detector is a non-dispersion infrared spectrometer (NDIR).

Holst et al teaches using a NDIR concentration detector 20 to detect a concentration of material in a gas flow. (Paragraph 55)

The motivation for using a NDIR concentration detector in the apparatus of Ono and Tokai et al is to provide a specific concentration detector as required but only generically disclosed by Holst et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the NDIR concentration detector of Holst et al in the apparatus of Ono and Tokai et al.

10. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ono and Tokai et al as applied to claims 30-33, 36, 40, 41, 43-47, and 51 above, and further in view of O'Neill et al, JP 07-188932.

Ono and Tokai et al differs from the present invention in that they do not teach that the gas analyzer is located upstream of the node.

O'Neill et al teaches a processing apparatus that includes a gas analyzer 46

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located upstream of the node.

The motivation for moving the gas analyzer of Ono and Tokai et al to a position upstream of the node as taught by O'Neill et al is to monitor the source gas without the inert gas, or to provide an alternate and equivalent location for the gas analyzer.

Furthermore, it has been held that the rearrangement of parts is obvious. (See In re Japikse 86 USPQ 70)

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to move the gas analyzer of Ono and Tokai et al as taught by O'Neill et al.

11. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita et al, JP 2001-214270, in view of Ono, JP 47-10730.

Tomita et al was discussed above.

Tomita et al differs from the present invention in that Tomita et al does not teach that the gas analyzer is located inline with the source gas supply line.

Ono was discussed above and teaches a gas analyzer 27 located inline with the gas line.

The motivation for moving the gas analyzer of Tomita et al from a line parallel to the source gas supply line to the source gas supply line is to provide an alternate and equivalent location for the gas analyzer as taught by Ono. Furthermore, it has been held that the rearrangement of parts is obvious. (See In re Japikse 86 USPQ 70)

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to move the gas analyzer of Tomita et al to a position inline with

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the source gas supply line.

12. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita et al, JP 2001-214270, in view of Ueda et al, US Patent 5,365,772.

Tomita et al was discussed above.

Tomita et al differs from the present invention in that Tomita et al does not teach that two valves isolate the gas analyzer.

Ueda et al teaches a gas analyzer 39 located parallel to a gas line 32 (from which the sample is taken) and isolated by valves 37 and 41. (Figure 3)

The motivation to add two valves to the gas analyzer of Tomita et al is to enable the gas analyzer to be isolated from the gas supply line for maintenance of the gas analyzer.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the isolation valves of Ueda et al to the apparatus of Tomita et al.

13. Claims 42 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita et al, JP 2001-214270, in view of Satake et al, JP 2001-234348.

Tomita et al was discussed above.

Tomita et al differs from the present invention in that Tomita et al does not teach that the concentration detector is a FTIR.

Satake et al teaches a coating chamber that includes a FTIR concentration detector 20. (Abstract, figure 7)

The motivation for using a FTIR concentration detector in the apparatus of

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Tomita et al is to provide a specific concentration detector as required but only generically disclosed by Satake et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the FTIR concentration detector of Satake et al in the apparatus of Tomita et al.

14. Claims 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita et al, JP 2001-214270, in view of Holst et al, US Patent Application Publication 2003/0056723 A1.

Tomita et al was discussed above.

Tomita et al differs from the present invention in that Tomita et al does not teach that the concentration detector is a non-dispersion infrared spectrometer (NDIR).

Holst et al teaches using a NDIR concentration detector 20 to detect a concentration of material in a gas flow. (Paragraph 55)

The motivation for using a NDIR concentration detector in the apparatus of Tomita et al is to provide a specific concentration detector as required but only generically disclosed by Holst et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the NDIR concentration detector of Holst et al in the apparatus of Tomita et al.

15. Claim 43-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita et al, JP 2001-214270, in view of Tokai et al, US Patent Application Publication 2002/0014700 A1.

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Tomita et al was discussed above.

Tomita et al differs from the present invention in that Tomita et al does not teach that the controller receives input from a manometer (pressure sensor) and corrects the measured concentration based on the pressure.

Tokai et al teaches a coating chamber that includes a controller 38 that controls the gas sources 14 based on input from concentration detectors 36, 37 and a pressure sensor 60.

The motivation for controlling the concentration of the source gas in the apparatus of Tomita et al using signals from both the concentration detector and pressure sensor as taught by Tokai et al is to control the source flows based on their concentrations, adjusted for the pressure.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to control the gas sources of Tomita et al using information supplied by the concentration detector and pressure sensor as taught by Tokai et al.

16. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita et al, JP 2001-214270, in view of O'Neill et al, JP 07-188932.

Tomita was discussed above.

Tomita differs from the present invention in that Tomita does not teach that the gas analyzer is located upstream of the node.

O'Neill et al teaches a processing apparatus that includes a gas analyzer 46 located upstream of the node.

The motivation for moving the gas analyzer of Tomita to a position upstream of

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the node as taught by O'Neill et al is to monitor the source gas without the inert gas, or to provide an alternate and equivalent location for the gas analyzer. Furthermore, it has been held that the rearrangement of parts is obvious. (See In re Japikse 86 USPQ 70)

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to move the gas analyzer of Tomita as taught by O'Neill et al.

### ***Response to Arguments***

17. Applicant's arguments directed to Ono, JP 47-10730, with respect to claims 30-33, and 36-52 have been considered but are moot in view of the new grounds of rejection.

18. Applicant's arguments filed January 12, 2007 have been fully considered but they are not persuasive.

In regard to the argument:

Independent claims 30 and 51 require a controller which controls the mass flow controller in response to the output from the gas analyzer. The reference does not appear to describe such a controller. The Office Action alleges the document provides for "a controller 31 controlling the MFC 23, 24..." see page 4 of the recent Office Action. However element 31 is described in the reference as a closing motion valve, see paragraph [0028] of the English translation, which is different from a controller as contemplated in the present claims.

The Examiner agrees. The Office Action of September 12, 2006 contained several typographical errors. The typographical errors have been corrected. The specification and figure of Tomita et al, JP 2001-214270, clearly shows and teaches that the controller 47 controls the mass flow controllers 33-37 based on input from the gas analyzer 46.

In regard to the argument:

Further, the Office Action does not clarify what elements in the reference correspond to the first mass controller in the vaporizing gas line and the second mass controller controlling the diluting gas. The reference appears to indicate that the source raw material evaporation section

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15 is directly connected to the gas supply way 2 which is connected to the reaction chamber 1. As such, the arrangement disclosed in the reference does not show a diluting gas line connected to the source gas line at a node between the source bottle and the reaction vessel. Instead the diluting gas, which appears to come from 32 in the reference, is upstream of the source gas. The oxygen installation way 39 and closing valve 40, although they connect between the source bottle and the reaction vessel, do not meet the requirements of the claim, because the claim requires a second mass flow controller controlling the flow of the diluting gas. The reference appears to provide mass flow controllers, but they are all upstream of the source raw material evaporation section 15.

The Examiner disagrees. The rejection clearly noted the vaporizing gas MFC and the diluting gas MFC, and that the diluting gas is connected to the source gas supply line.

The Examiner has tried to clarify the rejection. Tomita et al clearly teaches MFCs 33-36 (first MFC) are attached to the source bottles 16-19 via vaporizing gas supply lines 20-23. The vaporized source gas is connected to the reaction vessel 1 by source gas line 2. The source bottles are connected to the source gas line by lines 24-27. The diluting gas is supplied via MFC 37 (second MFC). The diluting gas is supplied downstream of the gas source bottle at the node formed by the connection of source gas supply line 2 and the line 24 from the source bottle.

### ***Conclusion***

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

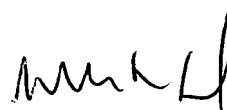
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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-1437. The examiner can normally be reached on Monday-Thursday (10:00 am - 9:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Jeffrie R. Lund  
Primary Examiner  
Art Unit 1763

JRL  
4/26/07